



APPENDIX C: EVALUATION OF ULTIMATE TERMINAL CAPACITY

1. Introduction

The examination of the ultimate capacity of the major functional components of the terminal and concourse area and landside facilities will provide the Tucson Airport Authority (TAA) with the information necessary to make critical decisions regarding pending capital improvement and expansion projects in the terminal and concourse area. The airport is currently in the midst of the construction of an expansion to the non-secure area of the terminal processor. This expansion includes the relocation of the arrival and departure curbside areas, will add approximately 80,000 square feet of space to the terminal and includes increased public circulation in the ticketing and baggage claim areas along with new larger claim devices. Other expansion projects are pending, including the construction of a new parking garage in front of the terminal, and expansion of the concourse and gate facilities to address requirements for security checkpoint expansion and improve passenger flows. The TAA requires an accurate estimation of the likely ultimate capacity of the terminal upon completion of this expansion project in order to ensure that future projects will provide a uniform ultimate capacity throughout the terminal and landside.

2. Executive Summary

Each of the major functional components of the terminal has their own capacity; the overall capacity of the terminal is determined by the component with the lowest capacity and which could not be expanded as necessary. Based on our analysis we estimate the overall capacity of the terminal facility to be approximately 7 million annual passengers (7 MAP), which is the estimated capacity of the baggage claim frontage after completion of the terminal expansion project. All other component areas were determined to either have an existing capacity greater than 7 MAP, or could be expanded to provide sufficient capacity to meet that level of demand. Baggage claim, specifically the claim devices and claim frontage, cannot be expanded beyond the seven claim devices and 986 lineal feet of claim frontage provided with the ongoing expansion project. We recognize that one of the seven claim devices is double sized and could be split into two individual units (total of eight) however this would not provide any additional claim frontage and therefore no additional capacity.

In the concourse area our analysis indicates that the capacity constraints are not so much a function of the available gates but the overall size of the concourse and the amount of space available for functions such as concessions, restrooms, holdrooms and circulation. It is our belief that the space available in the existing concourses would not be sufficient to meet the passenger demand if the airport were to see increased use of the existing gates. While we estimate that actual



gate counts would only have to grow approximately 45 percent, space requirements in the concourse area may need to double in order to accommodate a 7 MAP activity level.

Table C-1 summarizes the results of our analysis including estimated existing capacity of the major passenger processing components and future facility requirements to provide a uniform capacity of 7 million annual passengers. The following sections provide greater detail on the methodology used to estimate the capacities as well as the actual capacity estimates and expansion requirements of the individual components. Options for expanding other functional components will require further analysis to evaluate physical constraints, operational issues, and cost.

3. Methodology

The capacity of the various functional components in the terminal and concourse were determined by developing programmatic requirements for the 2009, 2016, and 2023 activity levels, determined as part of the Master Plan Update Forecast, plus an additional future demand level beyond the expected building capacity was identified. The existing capacity of the components was then estimated by comparing the size of the existing facilities to the space requirements for the various activity levels and interpolating. To provide the framework for future passenger and fleet characteristics a 9 MAP activity level was selected to represent an activity level that would be beyond the capacity of all of the major functional elements. The passenger peaking characteristics for the 9 MAP activity level were kept consistent with the existing peaking characteristics. This is reflective of typical growth in a spoke market such as Tucson and assumes that activity growth would be unconstrained until reaching capacity. Should activity begin to be constrained in certain areas such as airfield or gate capacity, the airlines would likely adjust their flight schedules somewhat to reduce the peaks and fill in the valleys. A depeaking of the schedule would result in a greater total annual capacity in the terminal; therefore our approach should provide an appropriately conservative estimation of the true capacity.

Programmatic space requirements are based on established industry standards and professional experience and represent Level of Service C criteria or greater. Major inputs in the space program model are annual enplanements, and peak hour passengers, both enplaning and deplaning. In this analysis two types of peak passenger levels were calculated, exclusive and common. Exclusive peak passenger levels refer to the peak periods by each carrier (which can occur in different hours for different carriers) and are used for calculating airline specific requirements such as ticket counters. Common peak passenger levels refer to actual peak passengers in a given hour, irrespective of airline. These values are used for non-airline specific facilities such as security checkpoints and concessions. This type of programmatic approach to facility sizing is commonly used as a first step during the planning and preliminary design of any terminal



Table C-1
Summary of Facility Capacity & Growth Requirements

	Existing Size ^{1/}	Existing Capacity	Future Requirement (7.0 MAP)	Required Growth
Terminal Processor				
Ticketing				
Positions (#)	99	5.2 MAP	134	35
Counter Length (ft)	495	5.6 MAP	670	175
Ticketing Area (s.f.)	4,879	5.5 MAP	6,700	1,821
Ticketing Queue (s.f.)	14,871	5.6 MAP	20,100	5,229
ATO Space (s.f.)	24,352	9.2 MAP	20,100	0
Baggage				
Claim Frontage (l.f.)	986	7.0 MAP	940	0
Claim Devices (#)	7	N/A	7	0
Claim Area	37,821	7.7 MAP	32,900	0
Make-up/Delivery (s.f.)	67,292	3.9 MAP	117,352	50,060
Screening / EDS (s.f.) ^{2/}	N/A	N/A	29,250	N/A
Security Screening				
Lanes (#)	6	4.2 MAP	13	7
Area (s.f.)	6,002	2.7 MAP	19,968	13,966
Concessions				
Non-Secure (Terminal) (s.f.)	14,350	7.0 MAP	14,190	0
Non-Secure Circulation				
Ticketing (s.f.)	33,584	19.0 MAP	13,400	0
Bag Claim (s.f.)	31,127	22.0 MAP	9,400	0
Meeter/Greeter Area (s.f.) ^{3/}	250	N/A	2,685	2,435
Rest Rooms				
Non-Secure (s.f.)	4,604	5.3 MAP	6,270	1,666
FIS Facilities (s.f.)	N/A	N/A	27,500	27,500
Concourses Facilities				
Airline Space				
Gates (#)	20	4.8 MAP	29	9
Holdrooms (s.f.)	27,726	< 3.6 MAP	68,083	40,357
Concessions				
Secure (Concourse) (s.f.)	12,764	1.7 MAP	38,310	25,546
Public Space				
Secure Circulation (s.f.)	21,406	2.9 MAP	50,055	28,649
Rest Rooms (s.f.)	1,510	2.0 MAP	5,720	4,210
Landside Facilities				
Curbfront				
Arrivals Curb (l.f.)	740	24.0 MAP	N/A	0
Departures Curb (l.f.)	740	9.0 MAP	N/A	0
Commercial Vehicle (l.f.)	1,510	11.5 MAP	N/A	0
Public Parking (with Current Surface Lots)				
Current Short Term (#)	469	4.2 MAP	737	268
Current Long Term (#)	908	3.3 MAP	1,904	996
Current Park N Save (#)	5,650	14.1 MAP	2,804	0
Public Parking (with Proposed Parking Garage)				
Covered Short Term (#)	499	4.8 MAP	737	238
Covered Long Term (#)	1,125	5.9 MAP	1,904	779
Surface Long Term (#)	497			
Current Park N Save (#)	5,650	14.1 MAP	2,804	0

^{1/} After current Terminal Expansion and Remodel is complete

^{2/} Security screening space requirements are included in Make-up and delivery area requirements above and presented separately for information purposes only.

^{3/} While presented separately for discussion purposes the meeter greeter area requirement is included in non-secure circulation (ticketing).



expansion project. Often as the process proceeds through design the actual areas realized for items such as holdrooms, circulation areas, concessions, and other spaced based requirements change either as a result of physical configuration, cost issues, or professional judgment without actually affecting the effective capacity of the facility.

The capacity of the landside elements was calculated in a somewhat different manner than the terminal and concourse components. The parking capacity was determined by estimating the actual demand at each facility based on current daily turnover rate for each type of lot, as well as the existing occupancy of each existing lot. Hourly occupancy characteristics of each type of lot were analyzed to determine the demand based on both the actual capacity and the practical capacity, which is considered to be 85 percent of the actual capacity. In order to reflect the influence of pricing on demand, the demand for each lot was "smoothed" to theoretically obtain the most efficient use of the existing parking spaces based on current total demand, if parking rates were perfectly adjusted. This smoothed demand was then related to the existing O&D passenger demand at the airport. The ultimate capacity of the parking system was then determined and correlated to a future O&D passenger demand.

The ultimate curbside capacity was estimated by determining the existing peak hour demand at the existing curbsides in units of "foot-minutes." The demand was related to the existing capacity to obtain a demand-to-capacity (d/c) ratio. The system was then analyzed to determine if there are any areas of improvement in the current operating conditions, such as improved police enforcement, that could extend the useful life of the facility. The ultimate curbside capacity was then calculated based on the increase in forecast O&D passenger activity.

In all cases it is important to note that while we have attempted to provide both an existing estimated annual capacity and, where necessary, future space requirements to achieve a balanced capacity throughout the building these numbers are not exact. Existing facility capacities and future space requirements are based on industry standards, smaller facilities can, and often do, serve just as many passengers as larger ones, they just tend to be a little more congested or passenger service times will be longer.

4. Existing Capacity Analysis

The following is a detailed discussion of the results of the analysis. This section covers all of the major components examined including:

- Terminal Processor
 - Ticketing
 - Baggage
 - Security Checkpoints
 - Circulation, including meeter/greeter space
 - FIS Facilities
- Concourse Facilities
 - Gates
 - Holdrooms
 - Rest Rooms
 - Concessions
- Landside Facilities
 - Arrival and Departure Curbfronts
 - Public Parking

Terminal Processor

The examination of the capacity of the terminal processor (generally defined as the public areas) focused on four major components, ticketing, baggage, circulation areas, and the security checkpoints. The following is a discussion of the capacity estimates for each of these major components and their associated subcomponents.

Ticketing

Ticketing is an airline specific function that serves the enplaning passenger exclusively. In evaluating the capacity of the ticketing area, we analyzed the number of ticketing positions available, the length of ticket counter available, ticketing area, and ticketing queuing areas available. Based on review of drawings and discussions with TAA staff we believe that there are approximately 99 ticketing positions and 495 lineal feet of ticket counter available at the airport today. The total ticketing positions include both physical podium positions staffed by an airline employee and electronic self check-in kiosks that have been installed by some of the airlines. It is our belief that these existing ticket counters positions can support approximately 5.2 MAP and the frontage available can support approximately 5.6 MAP. It is important to note that not all of the available ticket counter podiums are currently being used by the airlines. Furthermore, the expansion of the ticketing lobby as a result of the ongoing terminal development project will provide additional ticket lobby



circulation areas suitable for installation of additional self check-in kiosks in the future.

Ticketing and ticketing queue areas are functions of the counter frontage available. The ticketing area is the area between the ticket counter and the wall behind the counter, typically at least 10 feet of depth along the length of the ticket counter is provided. Ticketing queue is the area reserved for passenger queuing in front of the ticket counter; typically a minimum of 30 feet along the length of the ticket counter is reserved for this function. At TIA these areas seem to be sufficient to support the existing ticket counter frontage and would not impact the estimated ticketing capacity. Another airline ticketing function that doesn't specifically drive capacity but that should be verified is Airline Ticket Office (ATO). Generally ATO space is located directly behind the back wall of ticketing (but can be located in other terminal areas as necessary). Typically the ATO space should be at least 30 feet deep along the length of the ticketing counter. **Table C-2** below summarizes the existing ticketing areas and associated capacity.

Table C-2
Ticketing Capacity

Area	Existing Size	Estimated Capacity
Ticketing Positions ^{1/}	99	5.2 MAP
Ticket Counter Length	495 ft	5.6 MAP
Ticketing Area	4,879 sq ft	5.5 MAP
Ticketing Queue	14,871 sq ft	5.6 MAP
ATO Space ^{2/}	24,352 sq ft	9.2 MAP

^{1/} Includes electronic self check-in kiosks

^{2/} Includes all office areas located behind the ticket counters, some of which is not currently allocated to the airlines.

Baggage

The baggage system at TIA is comprised of both outbound and inbound systems, which are shared to some extent by the airlines. For this capacity analysis, we have assumed a baggage system that is essentially a common use system shared equally by the airlines. In reality the system will be subdivided into smaller discrete subgroups that each will be shared by a smaller number of the airlines based on location and operational requirements. The allocation of certain airlines to specific portions of the baggage system could impact the ultimate capacity of the system, however it is unlikely that this impact would be substantial. In this analysis we focused on the capacity of the baggage claim area and the inbound and outbound baggage areas including baggage screening.

The capacity of the baggage claim is primarily a function of the frontage available for passengers to claim their bags. Upon completion of the



current terminal expansion program TIA will have 7 baggage claim units with 986 lineal feet of claim frontage. Based on the number of projected peak hour deplaning passengers and baggage we estimate that the capacity of the baggage claim system is approximately 7.0 MAP. It is assumed that passengers will line up two to three people deep while waiting for their bags to arrive. It is recommended that a claim area approximately 35 feet deep along the length of the claim frontage be provided to allow passengers to wait for their bags, maneuver around the baggage claim devices and store claimed bags. Although the baggage claim device has been identified as having a capacity of 7.0 MAP, after completion of the terminal expansion project the 37,821 square feet of claim area would be capable of accommodating approximately 7.7 MAP.

The other key space requirement for the baggage system is the back-of-house area where the outbound baggage make-up, bag train circulation area, inbound baggage delivery, and TSA baggage screening (EDS) takes place. For purposes of this analysis we combined these functional requirements into a single bag make-up and delivery area requirement. Our measurements indicate that there is approximately 67,292 square feet of area available for these functions, which provides an estimated capacity of 3.9 MAP, with the major constraint being the area available for the five existing TSA baggage screening pods which has also reduced the area available for baggage make-up. **Table C-3** below summarizes the existing baggage areas and associated capacity.

Table C-3
Baggage System Capacity

Area	Existing Size ^{1/}	Estimated Capacity
Bag Claim Frontage	986 feet	7.0 MAP
Claim Units	7	N/A
Claim Area	37,821 sq ft	7.7 MAP
Bag Make-up and Delivery Area ^{2/}	67,292 sq ft	3.9 MAP

^{1/} After completion of the ongoing terminal expansion project

^{2/} Includes space adjacent to the make-up and delivery areas used for TSA baggage screening (EDS).

Security Checkpoints

Since the TSA has taken over responsibility for all passenger security screening at airports, size requirements and passenger processing capacities have continued to evolve to address new TSA mandated requirements. In estimating the capacity of the existing security checkpoints we have utilized current TSA requirements and passenger throughputs of approximately 1,500 square feet per lane and 170 passengers per lane per hour. The 1,500 square feet includes approximately 675 square feet for the TSA screening area and an additional 825 square feet of area designated for checkpoint queuing.



Based on the peak hour passenger demand forecast we estimate the existing 6 security checkpoint lanes provide an annual capacity of approximately 4.2 MAP while the total checkpoint and queuing area is only adequate for approximately 2.7 MAP. This reflects that six checkpoint lines have been squeezed into the space typically required for four. While the estimated capacity of the available area is below existing activity levels at the airport this does not mean one would expect to see serious delays at the security checkpoint throughout the day. However it is reasonable to expect that there would be congestion and potential delays in the peak periods. **Table C-4** below summarizes the existing security checkpoint areas and capacity.

Table C-4
Security Checkpoint Capacity

Area	Existing Size	Estimated Capacity
Number of Lanes	6 lanes	4.2 MAP
Checkpoint Area	3,850 sq ft	2.7 MAP
Checkpoint Queuing	3,425 sq ft	

Circulation

Circulation spaces are the areas in the terminal and concourses used by passengers and other terminal users to move from one location to another. These areas are generally free from obstructions and other passenger processing functions. However, certain service elements such as public phones, newspaper boxes, FIDS monitors, baggage cart dispensers, passenger standing areas, and small freestanding concession kiosks or carts are often found in circulation areas. For purposes of this capacity analysis we have focused on two specific circulation areas; public circulation, which includes circulation in the ticketing and baggage claim halls, and secure circulation, which is the circulation areas beyond the security checkpoints. With completion of the terminal expansion the public circulation areas will have very high capacity levels in aggregate but there may still be localized deficiencies in areas where large numbers of passengers tend to congregate.

The airport currently experiences periods of congestion in the public circulation areas in the hallways or throats leading from the terminal to the security checkpoints. This congestion results from the combination of arriving and departing passengers transitioning through the area and members of the non-traveling public who tend to congregate in the area to meet arriving passengers since security restrictions no longer allow them access to the gate area. This relocation of “meters and greeters” from the holdrooms to locations near where passengers exit security is a new challenge facing a number of airports since September 11th.



Evaluation of this sub area of the public circulation area at TIA indicates that after accounting for the space requirements for security queuing and arriving passenger circulation, each concourse throat only has approximately 125 square feet of space available for meters/greeters. This is located in the area between the escalators/stairs down to bag claim and the start of the ramp up to security and the concourses. There is some additional space available along the walls in the hall leading to the security checkpoint but use of this space will interrupt the smooth flow of passengers to and from the concourses. Using typical space requirements of 15 square feet per person means that more than 8 persons waiting in either of these areas will result in congestion. We estimate the total number of meeters/greeters in the peak 20-minute period is 103, requiring a total of 1,547 square feet of space allocated between the two concourses. Currently this space should be allocated 60 percent at the west concourse and 40 percent at the east based on the existing gate capacity; or 928 square feet on the west side and 619 square feet on the east. While there is an excess of public circulation space available, the location of the space doesn't align with the location of the demand for meeter/greeter space. Options should be explored that would relocate the meters/greeters into those locations where there is sufficient area to accommodate them such in the baggage claim area at the bottom of the escalators leading down from the concourses. Another option for accommodating meeters/greeters would be the existing Gallery area, however use of this area would require significant reconfiguration and a re-routing of the existing arriving passenger flows and circulation to baggage claim.

While the existing secure circulation capacity appears somewhat low, the configuration of the concourses at Tucson, with multiple gates at the very end of the concourses, tends to skew the apparent capacity because there is essentially no secure circulation associated with these gate positions. **Table C-5** summarizes both the public and secure circulation areas after completion of the terminal expansion project and the associated capacity estimates.

Table C-5
Circulation Area Capacity

Area	Existing Size	Estimated Capacity
Non-Secure Circulation		
Ticketing ^{1/}	33,584 sq ft	19 MAP
Baggage Claim ^{1/}	31,127 sq ft	22 MAP
Meeter/Greeter	250 sq ft	N/A
Secure Circulation	21,406 sq ft	2.9 MAP

^{1/} After completion of the ongoing terminal expansion project



Terminal Concessions

See discussion of non-secure concessions below in Concourse Facilities section.

International Arrival (FIS Facilities)

The existing international arrival facilities encompass approximately 15,852 square feet of total area located in a separate International Terminal Building. Because the existing FIS facilities are separate from the domestic terminal we have not included them in the existing capacity analysis. In the future, the airport intends to integrate the FIS facilities into the existing domestic concourse therefore the discussion of future facility requirements does include a discussion of FIS requirements.

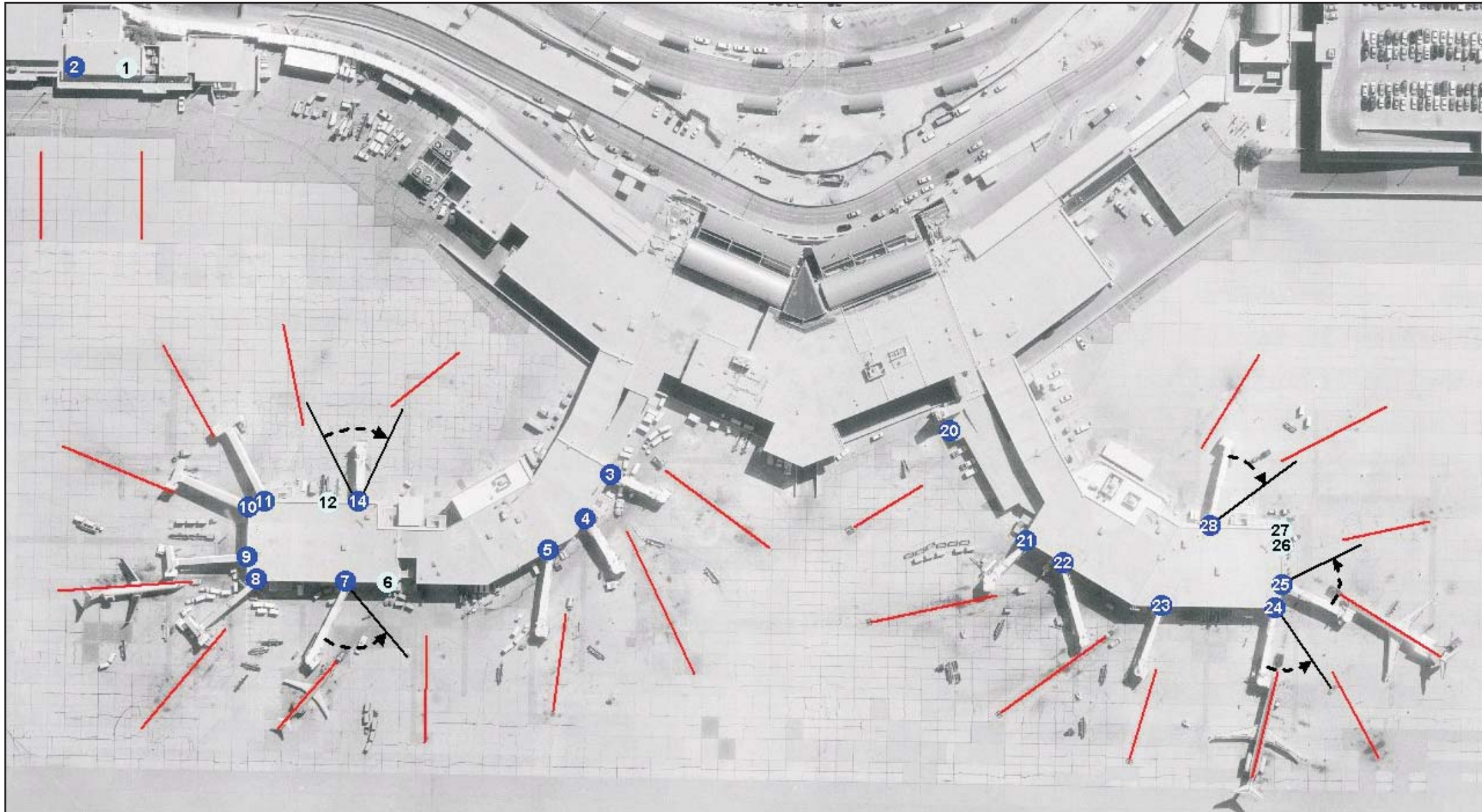
Concourse Facilities

The examination of the capacity of the concourse facilities focused on four major components, gates, holdroom areas, concessions, and restrooms. The following is a discussion of the capacity estimates for each of these major components and their associated subcomponents.

Gates

Currently not all of the available gate positions at the airport are being utilized. Of the 22 available gates (20 in the domestic concourse and 2 international gates) only 16 are actually in use on the domestic concourse (and only 15 of those have jet bridges), furthermore one of the gates lacks an associated holdroom and can only be used to unload arriving aircraft. **Exhibit C-1** graphically depicts the existing parking positions and gate use. Evaluation of the existing gate utilization and current activity levels indicates that each domestic gate accommodates approximately 122,000 enplanements annually. Given current gate

availability and the nature of air carrier activity in Tucson, we estimate that average gate utilization would only increase slightly, to approximately 125,000 to 135,000 annual enplanements per gate. Applying this utilization to the 19 existing available gate positions on the domestic concourse (currently all international departures take place from the domestic gates) would result in an estimated annual gate capacity from 4.8 to 5.1 MAP. Gate 20 is currently used only for the unloading of aircraft because it lacks any associated holdroom and access to the gate is on the non-secure or public side of the terminal. The estimated gate capacity is summarized in **Table C-6** below. The capacity calculation reflects the current exclusive-use utilization of the gates. Adopting a common-use or even a preferential-use policy for the gates would promote increased utilization and ultimately the airport could realize increased capacity from



TUCSON INTERNATIONAL AIRPORT

LEGEND

Gates

● In Use

● Not in Use

— Parking Positions

Update: 8/4/03



International Terminal

2. Aero California / Aero Litoral (Arrivals Only)

West Concourse

- 3. Delta
- 4. Delta
- 5. Alaska
- 7. United
- 8. America West (Shared with Continental)
- 9. America West (Shared with Continental)
- 10. Northwest
- 11. Northwest / Aero California (Departures Only)
- 14. United (Aero Litoral ground loads departures at East position)

East Concourse

- 20. Commuter
- 21. Southwest
- 22. Southwest
- 23. Southwest
- 24. American
- 25. American
- 26. Continental (Leased but not used)
- 27. Continental (Leased but not used)
- 28. Frontier

Totals

Total Gates: 22
Gates in Use: 17
Jet Bridges: 15
Aircraft Positions: 23

Gate Allocation by User



Landrum & Brown

EXHIBIT

C-1



the same gates. Further examination of the existing gate layout would be required to confirm that each of the 19 existing gate positions could actually be used for aircraft loading and unloading given the current holdroom configurations, door locations, and other interior space allocations. Additionally since only 15 gates currently have passenger loading bridges additional bridges would be required.

Table C-6
Gate Capacity

Area	Existing Size	Estimated Capacity
Gates	19 ^{1/}	4.8 – 5.1 MAP

^{1/}Based on the existing number of gates (not parking positions) at the domestic terminal. Currently only 16 of these gate positions are actually used. Because Gate 20 can only be used for unloading of aircraft it has not been included in the gate capacity analysis.

Holdrooms

In evaluating the capacity of holdrooms, physical location is an important factor. The available holdroom space needs to be in proximity to the gate and multiple gates with adjacent holdrooms effectively have additional holdroom capacity resulting from holdroom sharing between gates. Therefore, in evaluating the existing holdroom capacity for TIA, we focused on the specific gate configurations and utilizations currently in place at the airport. Industry standards for holdroom sizes take into account circulation areas inside the holdroom, between seating aisles, queue space in front of podiums and clear paths to boarding bridges. Holdroom calculations must also take into account the average width of the aircraft serving the gate in order to provide balance along the flightline assuring holdrooms are in proximity to the actual aircraft.

Currently at TIA there is approximately 27,482 square feet of holdroom space. This space is broken up into discrete areas that serve anywhere from one to eight gate positions. **Table C-7** shows a breakdown of the existing holdroom space available and estimated holdroom requirements for each of these gate groupings. In preparing this analysis we have only included those existing gates and holdrooms that are actually being used in the typical day and we have included a “sharing discount” to reflect the ability to share holdroom space between adjacent gates with contiguous holdroom areas. A ten percent discount has been included for gates with an adjacent holdroom on only one side and a fifteen percent discount has been applied for gates with adjacent holdrooms on both sides. Additionally, to reflect the specific operating characteristics of Southwest Airlines, namely frequent flights with short ground times resulting in passengers from more than one flight at the gate at the same time, we have included a heavy utilization factor for the Southwest gates. This



Table C-7
Holdroom Capacity

Gate Number	Gate Capacity	Holdroom Requirement	Sharing Discount ^{1/}	Heavy Utilization Factor ^{2/}	Individual Gate Requirements	Total Holdroom Requirement	Available Holdroom Space	Deficiency/ Excess
3	757	2,950	10%	0%	2,655	7,413	4,428	(2,985)
4	757	2,950	15%	0%	2,508			
5	NB	2,500	10%	0%	2,250			
6	N/A	0	0%	0%	0	13,383	10,756	(2,627)
7	NB	2,500	10%	0%	2,250			
8	NB	2,500	15%	0%	2,125			
9	757	2,950	15%	0%	2,508			
10	NB	2,500	15%	0%	2,125			
11	NB	2,500	15%	0%	2,125			
12	N/A	0	0%	0%	0			
14	NB	2,500	10%	0%	2,250			
20	N/A	0	0%	0%	0	0	0	0
21	NB	2,500	10%	40%	3,250	6,500	3,420	(3,080)
22	NB	2,500	10%	40%	3,250			
23	757	2,950	10%	40%	3,835	10,718	8,878	(1,840)
24A	NB	2,500	15%	0%	2,125			
24B	N/A	0	0%	0%	0			
25	757	2,950	15%	0%	2,508			
26	N/A	0	0%	0%	0			
27	N/A	0	0%	0%	0			
28	NB	2,500	10%	0%	2,250			
Total	15	N/A	N/A	N/A	38,013	38,013	27,482	(10,531)

^{1/} Reflects use of adjacent holdrooms for additional capacity as needed. Includes 10% for holdrooms with an adjacent holdroom on one side and 15% for holdrooms with adjacent holdrooms on both sides.

^{2/} Reflects that an additional 40 percent of the passengers from the next flight at the gate could be at the gate in addition to the passengers from the current flight.

^{3/} Gate 24B represents an existing second parking position served from the Gate 24 jet bridge. This position does not have it's own holdroom area and would be difficult to use independently from 24A in the future and therefore has not been included in this analysis.

analysis shows that each of these gate groupings are currently deficient in terms of total area required to accommodate the existing passenger requirements, based on the maximum aircraft capability of the gates. It is difficult to ascribe a specific annual passenger capacity to the holdroom groups however it is likely below the 3.6 MAP activity levels currently being experienced at the airport.

Concessions

Currently there is approximately 26,058 square feet of total concession space at TIA with approximately 14,350 sq ft in non-secure, or terminal, areas and 11,708 sq ft in the secure, or concourse, areas. Accepted industry standards recommend approximately 1,500 square feet of total concessions space per 100,000 enplanements with an additional markup to account for storage and service areas. Currently a 70 percent secure, 30 percent non-secure concessions split is standard. Based on these recommendations the concessions allocation at TIA results in excess capacity on the non-secure side while the secure concessions are undersized. The existing restaurant on the mezzanine provides the bulk of the non-secure concessions capacity.

As passenger activity levels increase, concessions spaces already undersized to accommodate the passenger demand in peak periods will experience overcrowding and a decline in the level of service leading to potential lost revenue at TIA. It is important to remember that while the secure concessions areas can support volumes of passengers beyond what is being experienced today, the level of passenger service drops dramatically as concession areas exceed their capacity, often causing passengers to bypass concessions entirely. The secure concessions area is likely to be the first area to show visible signs of degraded levels of service as passenger activity levels continue to grow at the airport. **Table C-8** summarizes the existing secure and non-secure concessions areas and estimated capacities.

Table C-8
Concessions Capacity

Area	Existing Size	Estimated Capacity
Non-Secure (Terminal)	14,350 sq ft	7.0 MAP
Secure (Concourse)	11,708 sq ft	1.6 MAP

Rest Rooms

The restroom capacity analysis examined available facilities and capacity for restrooms in both the secure and non-secure areas. Secure restroom facility requirements are a function of convenience and passenger demand and are typically calculated based on serving approximately 6 narrowbody gates per restroom module. Non-secure restroom facilities serve both passengers and meters and greeters and are required at both the enplaning and deplaning levels. Typical planning parameters for the non-secure area are to provide restroom facilities for every 40 ticketing positions on the enplaning level and every three baggage claim devices on the deplaning level. A typical restroom facility is comprised of a 1,100



square foot module, including both men's and women's facilities; family restrooms or assisted care facilities can be included in these modules as needed.

Currently there are approximately 1,580 square feet of restroom space in the secure (concourse) area and 4,604 square feet of non-secure (terminal) restroom facilities. This corresponds to annual capacities of approximately 2.0 MAP and 5.3 MAP respectively. Generally speaking the non-secure facilities are large enough for the current demand however the secure facilities are undersized for current activity levels based on today's standards. **Table C-9** below summarizes the estimated current restroom capacity.

Table C-9
Restroom Capacity

Area	Existing Size	Estimated Capacity
Non-Secure (terminal)	4,604 sq ft	5.3 MAP
Secure (concourse)	1,580 sq ft	2.0 MAP

Landside

The capacity evaluation of the landside components focused on two areas, parking and terminal curbside. The following is a discussion of the capacity of these components and their associated subcomponents.

Terminal Curbside

Terminal curbside data was not available during the peak historical month of activity (March). Therefore a survey of vehicle counts, mode types and sample dwell times was conducted at the airport on Thursday, July 17, 2003 and Friday, July 18, 2003. Data was collected for both private vehicles and commercial vehicles on the arrival and departure levels. Realizing that this survey was probably not collected on the peak day of the month, the data was increased by 15 percent to reflect peak day conditions. The data was then adjusted to reflect peak month conditions. It was determined from 2002 passenger levels that March (the peak month) passenger levels were 28 percent higher than July. Therefore the July activity was increased by 28 percent to represent peak month activity.

TIA is currently expanding the landside area of the terminal building. This expansion has resulted in the relocation and reconstruction of the curbside roadways, and the curbside data collected is reflective of the curbside configuration during this construction period. However the data still reflects the total curbside demand, and facility capacities are based

on the ultimate configuration of the curbside upon completion of the terminal expansion project.

Typically, a facility is considered constrained when the ratio of demand to capacity approaches 0.85. This assumes no changes (operational or physical) would be made to accommodate the increased demand (i.e.; remaining at existing capacity conditions). Although double parking is not common today, double parking is a common practice at airports and it could occur at Tucson's 3 to 5 lane curbs without significant capacity limitation. Therefore, double parking was accounted for in the future facility requirements as a way to extend the useful life of the curb. **Table C-10** below summarizes the existing curb areas and demand to capacity ratios as well as the projected annual capacity at a demand to capacity ratio of 0.85.

Table C-10
Curbfront Capacity

Area	Existing curb length	Existing Demand to Capacity Ratio	Estimated Capacity ^{1/}
Arrival Level (Private Vehicles)	740 ft	0.13	24.0 MAP
Commercial Vehicle Curb	1,510 ft	0.16	11.5 MAP
Departure	740 ft	0.46	9.0 MAP

^{1/} Assumes 30 percent double parking.
Source: Landrum & Brown, Inc.

Upon review of these results, there was initial concern that the estimated capacity of the Arrival Level curb (24 MAP) was too large. However, it was determined that, given actual curbside utilization on July 17 and 18, 2003, which formed the basis of the analysis, the estimated capacity would indeed be calculated at 24 MAP. While the upward adjustments made to the survey data to try to accurately replicate a true peak hour were considerable, it is likely that existing demand used in the analysis still may not have been large enough to accurately reflect peak month, peak day, peak hour conditions. A contributing factor may be that during the survey period only those vehicles that stopped at the curb to either wait for or pick-up their passengers were counted. A number of vehicles were observed to circle repeatedly or drive through without ever stopping and were not counted. If those recirculating vehicles were included as existing curb vehicles, the "existing demand" would be higher and the calculated Estimated Capacity would be lower than 24 MAP. It is recommended that these estimates be updated with a supplemental curb survey in March 2004, to get a more accurate database of existing demand.



However, while the 24 MAP Estimated Capacity of the Arrivals Curb may seem high, even if the current demand (including peak day and peak month adjustments) was actually twice the demand observed during the July survey, the Estimated Capacity of the curb would still be calculated at a high 12 MAP.

For comparison purposes, Midway Airport has approximately 600 feet of curb for private vehicles on the arrival level--140 feet less than Tucson—and yet accommodates almost 11 million total O&D passengers. Indianapolis International Airport has approximately 600 feet for private vehicles on the arrival level and currently accommodates just over 6 million total O&D passengers.

Parking Facilities

In order to more accurately identify the close-in parking requirements for the future terminal facilities, this analysis re-examined the base allocation between short and long-term demand, taking into account historic transaction data, current fee structures and proximity of current parking to the existing terminal.

Parking duration and occupancy information was obtained from airport staff, using data produced by the TIA parking software. An average day in the peak month (March 2003) was used for the occupancy analysis. Since duration data was not available for March, data for June 27, 2003, the peak day of June, was substituted.

To determine the peak occupancy of each parking lot, parking lot count information was examined for each parking facility, for every hour of an average day during the month of March 2003, which is historically the peak month. In order to more accurately identify parking requirements for the future demand levels, the analysis first examined the base allocation between short and long-term demand, taking into account parking duration.

A review of parking duration data in each lot indicates that 14 percent of people parked in the Long Term Lot for a short-term duration (0-4 hours). Therefore the actual short-term demand was adjusted to reflect these parkers as additional short term parking demand. The total daily number of daily parkers that parked from 0 – 4 hours in the long-term lot would be 53. Because short term spaces turn over several times throughout the day, several cars can use the same stall over the course of the day. Therefore the total number of daily short term parkers was divided by the average number of parkers using each space in a day. It was assumed that five cars would likely park in one short-term space each day. Dividing the daily number of transactions (53) by the daily vehicles per stall (5)



shows that 11 stalls in the long term lot are effectively being used as short-term stalls each day. This demand was added to the existing short-term parking stall demand in the Short Term Lot, and subtracted from the Long Term Lot demand. Discussions with TAA Staff has indicated that it is likely that a portion of the short term parking in the long term lot is associated with the business practices of the parking lot management company and reflects meetings and other business conducted in the ACE parking lot management offices.

Based on the duration data available no short-term parkers currently use the Park N Save Lot. Therefore, its totals were not adjusted.

In order to determine parking capacity, occupancy volumes were projected for both the existing parking facilities (surface lots) and the proposed new parking garage. Based on conversations with TIA staff, the proposed garage would be a three-level concrete structure with approximately 1,624 spaces, 499 spaces would be allocated for short-term parking and 1,125 spaces would be long-term with an additional 497 long-term spaces located in an adjacent surface lot. This would be an increase from the existing surface lots, which have 469 short-term spaces and 908 long-term spaces respectively.

Growth rates based on the percent of total annual passengers were applied to the occupancy for the each lot during the peak hour of the day, thus providing an occupancy for the peak hour during an average day of the peak month. The occupancies also include a 15 percent surplus factor to allow patrons to easily find a parking space.

Table C-11 depicts the estimated demand for close in and remote facilities compared to the capacity of both the existing surface parking lots as well as with the proposed parking garage. As indicated in the table the capacity for long-term parking is slightly less than current demand. It is important to note that this lot is not at its physical capacity yet but it has reached its operational capacity, which reflects the need for ease of finding a parking space.

Table C-11
Parking Capacity

Area	Existing Surface Lots		Proposed Parking Garage	
	Existing number of spaces	Estimated Current Capacity	Existing number of spaces	Estimated Capacity
Short-Term	469	4.2 MAP	499	4.8 MAP
Long-Term	908	3.3 MAP	1,622 ^{1/}	5.9 MAP
Park N Save	5,650	14.1 MAP	5,650	14.1 MAP

^{1/} Includes 497 spaces in a surface lot adjacent to the proposed garage.

Summary

The analysis reveals that the existing capacity of the various components of the terminal, concourse and landside areas varies widely. However, with the exception of the baggage claim frontage, the capacity of each of these components can be expanded. Capacity increases can be gained through construction of additional areas, provision of additional devices, or adaptation of various policies and procedures. Based on this, the appropriate ultimate terminal capacity is approximately 7 million annual passengers. That does not mean that the building couldn't ultimately accommodate more than 7 MAP, however as passenger demand approaches or exceeds the 7 MAP level passengers are likely to experience reduced levels of service and increased delays and queue lengths in peak periods. We believe that 7 MAP is an appropriate, conservative, planning level capacity estimate.

5. Future Expansion Requirements

The following sections discuss future facility requirements necessary to ensure all the components are adequately sized to match the ultimate future terminal capacity of 7 MAP. Currently all of the terminal, concourse and landside components analyzed have at least some subcomponents with an annual capacity of less than 7 MAP. Future programmatic space requirements were developed for each of these components based on the same industry standards and peak hour passenger characteristics used in the existing capacity determination. We have not made any attempt to present options for how the necessary expansions could be accommodated or any specific recommendations regarding the timing or cost of these expansions.

Terminal Processor

In order to serve a future annual demand of 7 MAP ticketing, baggage make-up and delivery, security checkpoints and secure circulation areas will all need to be expanded. Growth of ticketing from its current capacity of approximately 5.2 MAP will require provision of an additional 35 ticketing positions. These additional positions can be manned podium positions, electronic self check-in kiosks or a combination. This would correspond to an additional 175 feet of ticketing frontage if they were to be all staffed podiums. Because there is a large amount of space available in front of the ticket counters and opportunities for growth in ticketing frontage is limited, it is likely that the majority of the additional positions will be electronic kiosks. Ticketing area and queuing requirements will grow as well, however the exact areas will be a function of the types of additional positions added.

The baggage claim area will be sufficient to meet the demands of a future 7.0 MAP activity level but the bag make-up, delivery, and screening areas will need



to be expanded. We estimate that the total area for bag makeup, inbound bag delivery, TSA screening, and bag train circulation and staging will have to be expanded by approximately 50,060 square feet. While we have assumed that this expansion can be accommodated, probably through expansion towards the airside, this is an area that should receive further evaluation to determine the feasibility of such an expansion. A total of 29,250 square feet of space will be required for TSA baggage security screening such as in-line EDS or similar equipment. This area requirement is included in the 117,352 square feet of total bag makeup and delivery area space requirement.

The security checkpoint function is the component of the terminal processor that will need to be expanded the most to accommodate a 7 MAP demand level. The expansion will require both an increase in the number of lanes available as well as an increase in total area dedicated to passenger screening. In order to accommodate 7 MAP we estimate 7 additional checkpoint lanes (total of 13), and 13,996 square feet of additional area, will be needed.

With the completion of the ongoing terminal expansion project, the public circulation space on both the upper and lower levels of the terminal will be more than sufficient to accommodate 7 MAP. However, secure circulation areas in the concourses will need to be expanded by approximately 28,649 square feet. Secure circulation is however typically a byproduct of the concourse layout as opposed to a specific capacity target. The exact secure circulation requirements can only be determined when the future concourse layout configuration is determined. As discussed in the existing capacity section, an important subset of the public circulation is the meeter/greeter requirement. Using typical space per person requirements and an estimate of 179 meeters/greeters in the peak 20 minutes for a 7 MAP activity level results in a requirement of a total of 2,685 square feet of space for meeters/greeters. It is impossible to break this total requirement out between the east and west concourses at this time. The allocation between the east and west concourses is a function of the peak demand in each concourse and the concourse peaking characteristics can only be estimated after the gate expansion concepts have been developed and the airline gate allocations have been determined. This requirement assumes that the current security restrictions allowing only ticketed passengers past security screening remains in effect. If this were to change in the future, then the meeter/greeter area requirements would be reduced significantly as most people would meet the arriving flights at the gate as they had in the past.

It is the airport's desire to relocate the existing international arrival functions (FIS facilities) from the current independent international terminal into the existing domestic terminal and concourse complex. Based on our forecast of peak international activity associated with the 7 MAP activity level, a replacement FIS facility would require approximately 27,500 square feet of space. This number is based on current design standards published jointly by the various US Government agencies involved in international passenger inspection. The space



requirements include all the required break areas, examination rooms, and other facilities required by the various US agencies including Customs and INS, Public Health, Agriculture, and Fish and Wildlife. Major components included in the FIS facility include a single baggage claim device, three INS inspection booths, and a pair of secondary counters for both Customs and Agriculture. These space requirements do not include an allocation of space for international meeters/greeters, security re-screening, or baggage recheck. Meeter and greeter space and security re-screening are a function of the ultimate location of the FIS facility and where the arriving international passenger exits the FIS facility. Additionally these requirements do not include any additional space for the inspection of GA aircraft, however this is an issue that will have to be resolved in determining the future location of the new FIS facilities.

Table C-12 below summarizes the facility requirements for the various components of the terminal processor required to accommodate an annual activity level of 7 MAP.

Concourse Facilities

In order to accommodate the 7 MAP activity level the existing concourse facilities will need to be expanded. This expansion will include additional gates, and an overall growth in concourse area to accommodate additional holdrooms, concessions, and restrooms as well as the increased secure circulation areas discussed previously. Assuming that gate utilization will improve somewhat over current levels to approximately 125,000 to 135,000 annual enplanements per gate, an activity level of 7 MAP would result in the need for 26 to 29 total gates including international activity. The existing domestic concourses currently have a total of 20 numbered gate positions. Of the 20 existing positions only 16 of them are currently being used and only 15 of those have jet bridge access and one can only be used for passenger unloading, leaving an effective existing gate count of 19. We have not included the second parking position serviced by Gate 24 today as it would be extremely difficult to operate that parking position as an independent gate, nor have we included Gate 20 since it can only accommodate passenger unloading. In estimating future gate requirements we have assumed that the existing unused positions would be used first and the seven to ten additional aircraft gate positions would be developed as needed, through extensions to the existing east and west concourses. The ability to use the gates that currently are not in use was not evaluated in this analysis. While we believe it is generally feasible, this will ultimately need to be examined in greater detail to evaluate the impact of future space requirements on existing concourse facilities such as concessions and restrooms. Particular attention would need to be paid to the future use of Gate 12 and the Gate 26-27 area. In expanding the gate capacity, it may be necessary to acquire new jet bridges for the existing gates that lack them.



Table C-12
Summary of Terminal Processor Requirements –
7 Million Annual Passenger Demand Level

Component	Existing Size	Future Requirement	Growth
Ticketing			
Positions ^{1/}	99	134	35
Counter Length	495 ft	670 ft ^{2/}	175 ft
ATO Space	24,352 sq ft ^{3/}	20,100 sq ft	0
Baggage			
Claim Frontage	986 ft	940 ft	0
Claim Devices	7	7	0
Make-up and Delivery ^{4/}	67,292 sq ft	117,352 sq ft	50,060 sq ft
EDS/Bag Screening ^{5/}	N/A	29,250 sq ft	N/A
Security Screening			
Lanes	6	13	7
Checkpoint Area	3,850 sq ft	8,775 sq ft	4,925 sq ft
Queue Area	3,425	10,725 sq ft	7,300 sq ft
Circulation Area			
Non-Secure ^{6/}	64,711 sq ft	22,800 sq ft	N/A
Secure	21,406 sq ft	50,055 sq ft	28,649 sq ft
Meeter/Greeter	250 sq ft total	2,685 sq ft total	2,435 sq ft total
FIS Facilities	N/A	27,500 sq ft	27,500 sq ft

^{1/} Includes freestanding electronic kiosks.

^{2/} Assumes all additional positions would be fixed podiums.

^{3/} Includes all office space currently located behind the ticket counters, not all of which is currently used by the airlines.

^{4/} Includes 29,250 square feet for TSA EDS/Bag Screening area

^{5/} Included in the total Make-up and Delivery space requirements above.

^{6/} Includes both upper and lower levels (ticketing and bag claim).

The future concourse expansions required to create the seven to ten additional gates will also require a detailed analysis. Currently the ability to expand the concourses to the west is limited by the existing fuel farm and GA access to the existing FIS facilities. The airport's current plan to relocate the fuel farm to an alternative location will provide an opportunity for additional western concourse expansion. The remainder of the concourse expansion will have to take place either to the east or by filling the area to the south of the terminal, between the concourses. In planning the gate expansion, consideration should be given to identifying options for incorporating the FIS facilities into the current domestic concourses and the creation of at least two international/domestic "swing" gates.

The future design day fleetmix developed as part of the master plan update study represents a 5.9 MAP activity level and still contains a significant amount of activity by regional jet sized aircraft. Therefore, it is reasonable that some of the additional gates could be sized to accommodate only regional jet type aircraft. In order to be conservative in our estimate, we have assumed that all of the additional gates would be able to accommodate a typical narrowbody aircraft such as the Airbus A320 or Boeing 737. This would ultimately provide the airport



with better flexibility to meet the needs of a wide range of carriers. Additionally while there will continue to be some growth in gage as activity levels approach 7 MAP we feel that the five existing B757 capable gates would be sufficient to meet the future demand for that size aircraft.

In order to accommodate 7 MAP an additional 40,351 square feet of holdroom area would be required to support passenger activity at an appropriate level of service. The additional holdroom requirements were determined by combining the additional space required to serve all of the existing gates plus the nine additional gates that would be required for this level of activity. As with the evaluation of the existing holdroom capacity we focused on groups of contiguous holdrooms and the potential for sharing of capacity between gates. The holdroom space requirement for the additional gates was estimated by assuming two new gate groups and calculation holdroom space requirements based on their associated fleet mix. **Table C-13** summarizes the individual gate groupings and specific holdroom requirements in each of the areas. The actual future holdroom requirements will have to be reviewed and adjusted based on the actual concourse expansion plan, which would likely result in different gate area configuration and holdroom groupings.

As indicated previously, the existing concessions areas in the secure or concourse areas are below recommended industry standards for the existing activity levels. Applying industry standards to the ultimate capacity level of 7 million annual passengers results in the need for an additional 25,546 square feet of concessions areas, all on the secure side. The existing concession capacity on the non-secure side is sufficient for the 7 MAP activity level. Existing concessions support facilities will need to be expanded as well.

Additional restroom facilities in both the secure and non-secure areas will be required to meet the 7 MAP level of demand. On the secure side approximately 4,210 square feet of additional restroom facilities would be required, or approximately 4 additional 1,100 square foot restroom modules. On the non-secure or public side approximately 1,666 square feet of additional facilities or 1 to 2 additional modules would be desirable. **Table C-14** summarizes the facility requirements for the various components of the concourse area required to accommodate an annual activity level of 7 MAP.

Because growth in the concourse area can and likely will be undertaken in phases we have attempted to identify the future concourse area requirements not only at the 7.0 MAP activity level but at some additional intermediate activity levels leading up to the 7.0 MAP level. **Table C-15** summarizes the incremental concourse facility requirements for 4.2, 4.7, 5.3, and 5.9 MAP activity levels.



Table C-13
Future Holdroom Requirements
7 MAP Demand Level

Gate Number	Gate Capacity	Holdroom Requirement	Sharing Discount	Heavy Utilization Factor	Individual Gate Requirements	Total Holdroom Requirement	Available Holdroom Space	Deficiency/ Excess
3	757	2,950	10%	0%	2,655	7,413	4,309	(3,104)
4	757	2,950	15%	0%	2,508			
5	NB	2,500	10%	0%	2,250			
6	NB	2,500	10%	0%	2,250	17,633	11,313	(6,320)
7	NB	2,500	15%	0%	2,125			
8	NB	2,500	15%	0%	2,125			
9	757	2,950	15%	0%	2,508			
10	NB	2,500	15%	0%	2,125			
11	NB	2,500	15%	0%	2,125			
12	NB	2,500	15%	0%	2,125			
14	NB	2,500	10%	0%	2,250	13,500	0	(13,500)
13	NB	2,500	10%	0%	2,250			
15	NB	2,500	10%	0%	2,250			
16	NB	2,500	10%	0%	2,250			
17	NB	2,500	10%	0%	2,250			
18	NB	2,500	10%	0%	2,250			
19	NB	2,500	10%	0%	2,250	2,500	1,008	(1,492)
20	NB	2,500	0%	0%	2,500			
21	NB	2,500	10%	40%	3,250			
22	NB	2,500	10%	40%	3,250	6,500	2,944	(3,556)
23	757	2,950	10%	0%	2,655	13,788	8,152	(5,636)
24A	NB	2,500	15%	0%	2,125			
24B	N/A	0	0%	0%	0			
25	757	2,950	15%	0%	2,508			
26	NB	2,500	15%	0%	2,125			
27	NB	2,500	15%	0%	2,125			
28	NB	2,500	10%	0%	2,250			
29	NB	2,500	10%	0%	2,250	6,750	0	(6,750)
30	NB	2,500	10%	0%	2,250			
31	NB	2,500	10%	0%	2,250			
Total	28	N/A	N/A	N/A	68,083	68,083	27,726	(40,357)



Table C-14
Summary of Concourse Area Requirements -7 Million Annual Passenger Demand Level

Component	Existing Size	Future Requirement	Growth
Gates	19 ^{1/}	26 – 29	7 - 10
Holdrooms	27,482 sq ft	67,833 sq ft	40,351 sq ft
Concessions			
Secure (Concourse)	11,708 sq ft	38,310 sq ft	26,602 sq ft
Non-Secure (Terminal)	14,350 sq ft	14,190 sq ft	0
Restrooms			
Secure (Concourse)	1,510 sq ft	5,720 sq ft	4,210 sq ft
Non-Secure (Terminal)	4,604 sq ft	6,270 sq ft	1,666 sq ft

^{1/} Domestic concourse gates only.

Table C-15
Incremental Concourse Area Requirements

		Existing	Future Requirements				
Activity Level		3.6 MAP	4.2 MAP	4.7 MAP	5.3 MAP	5.9 MAP	7.0 MAP
Approx. Year ^{1/}		2003	2008	2013	2018	2023	2034
Airline Space							
Gates		19	19	19	21	24	29
Holdrooms (s.f.)							
Gates 3-5		4,428	7,413	7,413	7,413	7,413	7,413
Gates 6-14		10,756	17,633	17,633	17,633	17,633	17,633
Gate 20		-	-	-	-	-	-
Gates 21-22		3,420	6,500	6,500	6,500	6,500	6,500
Gates 23-28		8,878	13,788	13,788	13,788	13,788	13,788
New Gates		-	-	-	4,500	11,250	22,500
Subtotal		27,482	45,334	45,334	49,834	56,584	67,833
Concessions							
Secure (s.f.)		12,764	20,160	22,425	24,689	27,860	38,310
Public Space							
Secure Circulation (s.f.)		21,406	31,410	34,900	38,389	43,275	50,055
Rest Rooms (s.f.)		1,580	3,630	4,018	4,406	4,950	5,720

^{1/} Reference to specific years is based on Forecast of Aviation Activity for Tucson International Airport, 2003, prepared by Landrum & Brown



Landside Facilities

Examination of the capacities of the landside facilities indicates that the existing terminal curbside have sufficient existing capacity to serve a 7 MAP demand level. However the parking facilities, even with the construction of the proposed parking garage may need to be expanded.

As noted in the Existing Capacity Section, the short-term and long-term areas of the existing surface parking lot do not provide sufficient capacity to accommodate the 7 MAP future demand level. However the airport has proposed development of a new parking garage at the site of the existing surface parking lot. Our evaluation of this garage indicates it also would exceed capacity prior to reaching the 7 MAP activity level based on its current design, and specifically the proposed allocation of short and long-term spaces. It is important to note that when looking at the parking system in its entirety, the existing facilities provide a total of 7,000 spaces. However only 5,445 spaces in total are required to accommodate the 7 MAP demand level. Therefore the entire parking system would have an excess of 1,582 spaces. **Table C-16** below summarizes existing capacities of the surface parking lot, the 7 MAP future facility requirements, and the additional spaces required.

Table C-16
Total Peak Public Parking Future Facility Requirements

Facility	Existing Capacity (Spaces) 1/	7 MAP Facility Requirement (Spaces)	Additional Spaces Required
Short-Term	469	737	268
Long-Term	908	1,904	996
<i>Total Close-In</i>	1,377	2,641	1,264
Park N Save	5,650	2,804	0
<i>Total Remote</i>	5,650	2,804	0
TOTAL SPACES	7,027	5,445	N/A

Source: TIA parking software and Landrum & Brown, Inc.

1/ Based on existing surface parking lots

Because the total number of parking spaces available airport wide exceeds the total requirements to accommodate the 7 MAP activity level after the proposed parking garage is constructed, it may not be necessary to construct additional facilities or change the design for the parking garage but instead options for shifting demand between close in parking and the Park N Save facility could be explored. As shown in Table 15 above, short-term parking facilities will need to have 737 spaces in order to accommodate 7 MAP. Realizing that short-term parking is a premium service and a revenue generator that cannot be



redistributed to a remote or off-site area, the required 737 spaces should be accommodated in the parking garage. The remaining 1,402 spaces within the garage and adjacent surface parking lot would then be designated and priced as long-term. Primarily by adjusting parking rates, the remaining demand for 502 long-term parking spaces could then be shifted to the Park N Save Lot where there would be excess capacity.